

Montana Weather/Precipitation Summary

December 2015 NOAA's National Weather Service Great Falls Montana

Generally west to northwest flow dominated December's weather in Montana (Fig. 1), which is normal. Temperatures were slightly below normal over the south central and southwest, and above normal elsewhere. Precipitation was mostly above normal, with areas of below normal in the north central and southeast. December's winds were below the long-term average.

Statewide composite temperatures averaged 2.6°F above normal for the month. The temperature anomalies ranged from -1.2°F at Dillon WMU to +6.9°F at Baker (Fig. 2). The warmest average monthly temperature was 31.6°F at Troy, and the coolest was 12.8°F at West Yellowstone. This was the 62nd warmest December of record. For the past 12-months, the statewide composite average temperature is 2.6°F above normal. Ten of the last 12 months and 16 of the past 24 months have had warmer than normal temperatures.

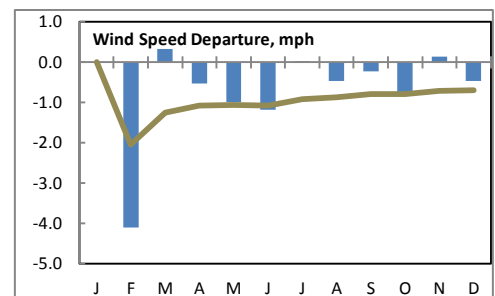
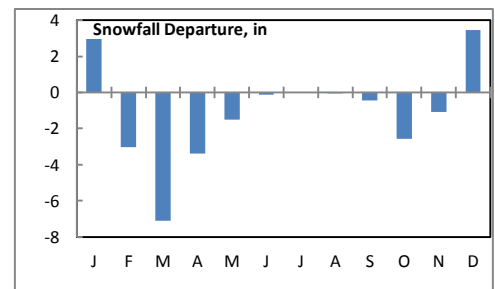
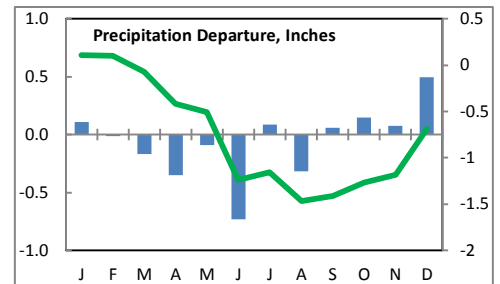
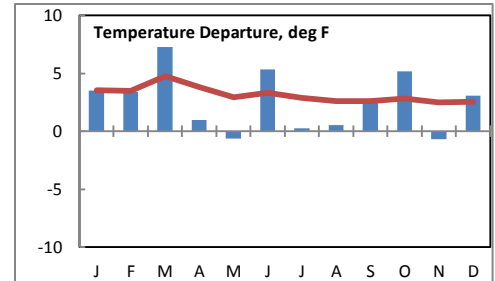
The monthly departure from normal for precipitation across Montana is shown in Figure 3. Above normal precipitation fell across most of the state, except in the north central and southeast portions. The highest amount recorded was 14.40-inches at Poorman Creek SNOTEL. Statewide, this month averaged 1.29-inches, or 0.50-inches above normal. Although above normal precipitation has fallen since September, the statewide composite precipitation for the past 12 months is 0.69-inches below normal. With little snowfall in September and October, snowfall totals remain on the lighter side. Some areas of Montana, especially the west and south central had above normal snowfall in December. The monthly composite was 14.4-inches, or 3.5-inches above normal (figure on right). This is the 24th snowiest December of record, and the snowiest since 2010.

The statewide average winds were slightly below normal this month, ranking as the 14th calmest December of record. The statewide composite average was 8.5 mph, 0.5 mph below normal. The 12-month average is running 0.7-mph below average. The fastest average speed was 20.0 mph at Livingston, with a higher elevation location, Deep Creek RAWS, recording 21.8 mph. The fastest measured gust of the month, 86-mph, occurred at Deep Creek RAWS on the 8th. Two Medicine recorded a gust to 79 mph on the 8th.

Refer to NEIC's State of the Climate report for the latest monthly discussion:
<http://www.ncdc.noaa.gov/sotc/>.

December 1-12

Above normal temperatures dominated during the first half of December. This brought generally windy conditions east of the divide. Cold air trapped in western valleys and rain produced freezing rain conditions to western Montana on the 4th. From Haugen to Superior I-90 was closed for a period on the 4th due to freezing rain and several accidents. A larger storm brought rain to



much of western Montana on the 7th. Precipitation amounts were as high as 4-inches at Hoodoo Basin and Flattop Mountain. Even lower elevations, such as Heron, picked up almost 3-inches. Gusty winds on the 8th and 9th produced gusts to 79 mph at Two Medicine on the 8th and 76 mph at Cascade on the 9th. The highest gust of the month occurred at Deep Creek RAWS on the 8th, with a gust of 86 mph.

December 13-21

A winter storm that affected most of the state started in western Montana on the 13th. Up to 5-inches of snow fell at Happys Inn (Lincoln). This system spread eastward with two-day snow totals of 3-feet of snow at Tizer Basin, 1.5 feet at Big Timber, Melville (Sweet Grass), Absarokee Stillwater), Maxwell (Granite), and Stockett (Cascade). Billings picked up 10-inches of snow. In general, 3-6 inches of snow fell over western Montana, at lower elevations. On the 14th, with 8.2-inches of snow, Great Falls established a new all-time December daily precipitation record. 0.77" of precipitation was recorded, with broke the old record of 0.74" set on the 29th in 2010. Another round of freezing rain occurred in the Corvallis (Ravalli) area on the 18th, while on the 18th and 19th, Seeley Lake, Missoula and Clinton picked up another 7-inches of snow. As this system moved across southern Montana, higher elevations around Cooke City measured 13-inches of snow.

Dec 22-31

Heavy snow fell over portions of western Montana on the 22nd and 24th. On the 22nd, Kalispell and Creston measured 7- and 8-inches, respectively. Another push of Pacific moisture brought 9-inches to Heron (Sanders) and on 24th. The coldest part of the month occurred from the 24th-27th. A location near Scobey dropped to -27°F on the 26th, while West Yellowstone reached the same temperature on the 27th.

Precipitation/convection

Severe convective weather occurred on zero days in December, which is normal.

Calendar year 2015

Temp 45.8°F or 2.6°F above normal. This was the warmest year since 1987 and the third warmest of record. Annual extremes were 109°F near Troy on June 29, and -35°F at Brockway in January.

Precipitation 14.32 inches, 0.69 inches below normal. 14th wettest of record, the wettest since 2010. The highest amounts were 68.6-inches at Poorman Creek (Lincoln) and 68.28-inches at Haugen (Mineral). The lowest amount was 8.11-inches at Twin Bridges.

Snow averaged 40.5 inches for the year, 12.9 inches below normal. This was the 24th lowest calendar year amount of record, and the lowest since 2004. Mystic Lake measured 154.7-inches over the year.

Winds averaged 8.8 mph, the 16th calmest of record, and the lightest composite statewide winds since 2013. The highest gust was 108 mph in the Sweet Grass Hills on November 18.

December summary information:

High Temperature	66°F at Billings (9 th)	Greatest Precip	7.07" at Noxon
Low Temperature	-27°F near Scobey (26 th) and near West Yellowstone (27 th)		14.40" Poorman Creek SNOTEL
Warmest Ave Temp	31.6°F at Troy	Peak Wind Gust	86 mph at Deep Creek RAWS (8 th)
Coollest Ave Temp	12.8°F at West Yellowstone		79 mph at Two Medicine (8 th)
Range of Temp departures	-1.2°F at Dillon WMU to +6.9° at Baker	Highest Ave Wind	20.0 mph at Livingston 21.8 mph at Deep Creek RAWS
21 city mean monthly Temperature/Normal	23.4/20.3F 3.1F above normal. 62nd warmest of record (since 1880). 54 th percentile. Oct-Dec 34.1/31.6 2.5F above normal. 41 st warmest of record.	20 city mean monthly wind speed/Normal	8.5 mph/9.0 mph; 14 th calmest of record (since 1936). 17 th percentile. Oct-Dec 8.5 mph/8.9 0.4-mph below normal. 13 th calmest of record.
22 city mean monthly precipitation/Normal	1.29/0.79" – 163% of normal. 14 th wettest of record (since 1880). 89 th percentile. Oct-Dec 3.46"/2.73" – 0.73" above normal. 25 th wettest of record.		

**Historical Rank of Precipitation (inches)
for the Current Month and Water Year to Date**

Location	Dec	% of Norm	Rank	Pcntl	Oct 1 – Dec 31	% of norm	Rank	Pcntl	Years
Baker	0.06	25%			1.08	55%			18
Billings	0.57	85%	75	64	2.85	106%	83	72	115
Belgrade	0.57	112%	46	58	2.85	120%	56	71	79
Butte	0.67	131%	84	69	2.74	145%	98	80	122
Cut Bank	0.22	110%	47	43	1.58	158%	80	73	109
Dillon	0.41	158%	62	81	2.08	155%	65	85	76
Glasgow	0.71	178%	93	78	2.98	192%	113	96	118
Great Falls	1.07	195%	100	80	5.10	255%	124	100	124
Havre	0.42	105%	69	50	1.93	137%	91	67	136
Helena	0.74	185%	93	67	1.70	108%	62	45	138
Jordan	0.75	259%			3.69	235%			19
Kalispell	2.44	156%	108	88	4.05	101%	74	60	122
Lewistown	0.67	102%	62	51	2.19	88%	43	35	120
Livingston	1.36	262%	111	96	4.09	173%	106	94	113
Miles City	0.02	7%	3	1	1.26	79%	44	31	139
Missoula	1.35	132%	99	71	3.36	113%	80	59	136
Mullan Pass	11.00	247%	74	97	18.16	147%	63	83	76
Wolf Point	0.21	70%			1.67	111%			18
Glendive	0.30	79%	46	37	1.09	58%	34	28	117
Sidney	0.27	52%	28	36	1.30	60%	28	36	76
BZN-MSU	1.54	166%	118	87	4.78	124%	119	87	137

Rankings and Percentiles are 1=driest, higher numbers=wetter.

For an automated version of this chart, updated daily, go to

<http://www.wrh.noaa.gov/tfx/dx.php?wfo=tfx&type=&loc=products&fx=PCPNTOTALS>

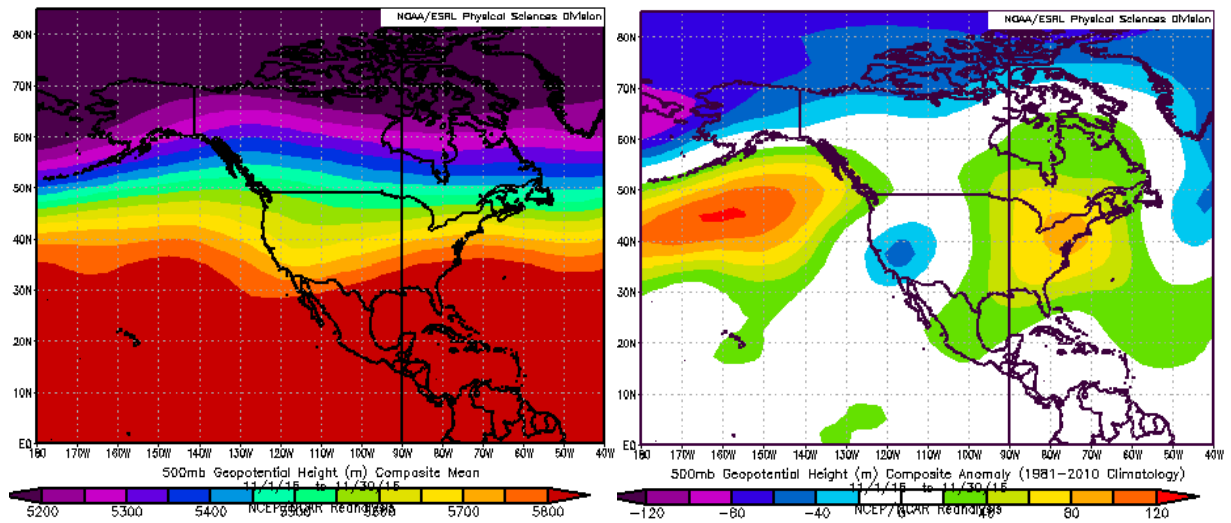


Figure 1. Mean flow at 500 millibars (~18,000 ft) for this month (left) and departure from normal (right).

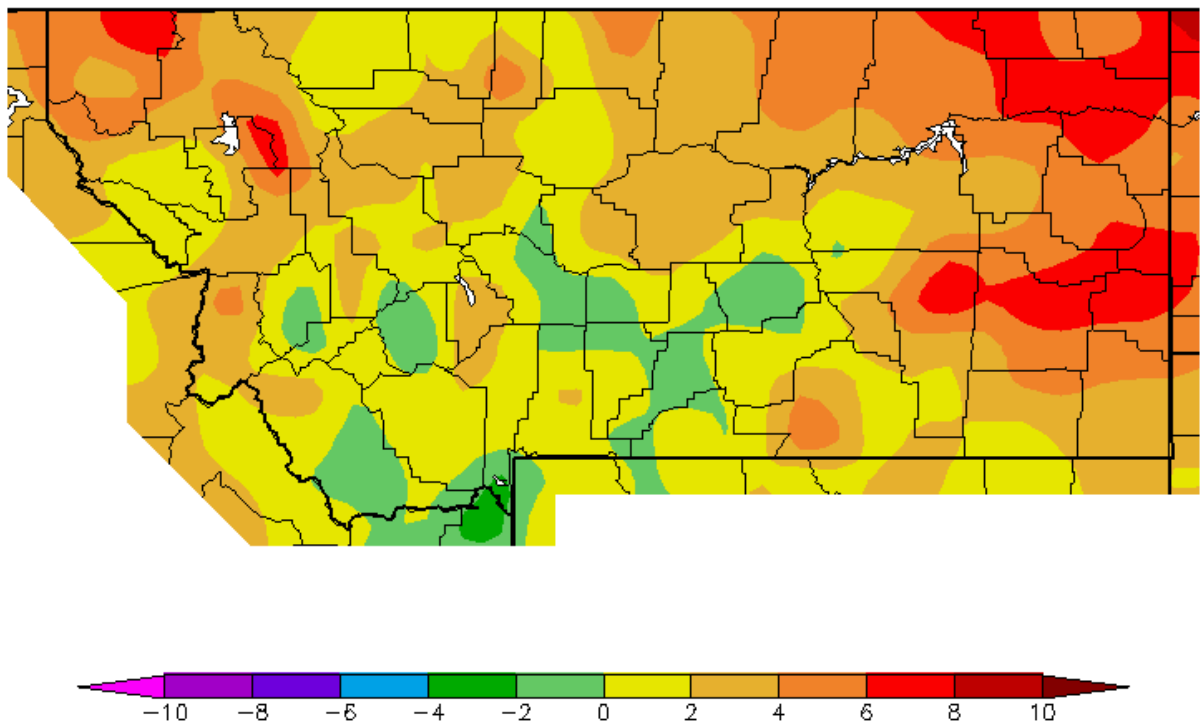


Figure 2. December 2015 temperature departures from normal (°F) (Western Region Climate Center).

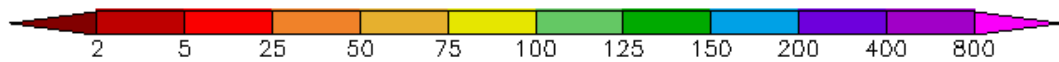
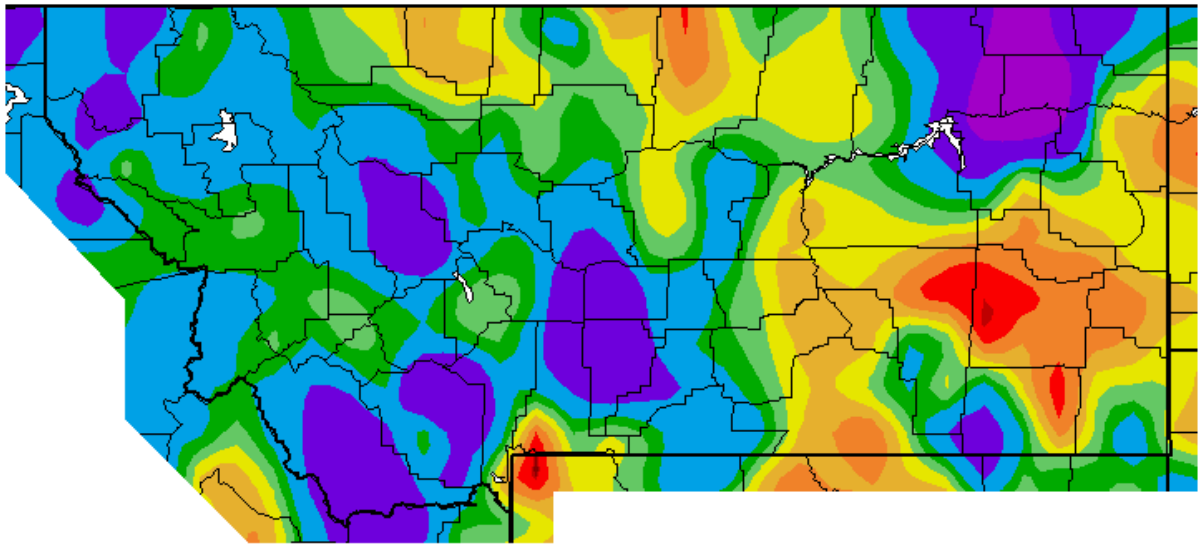
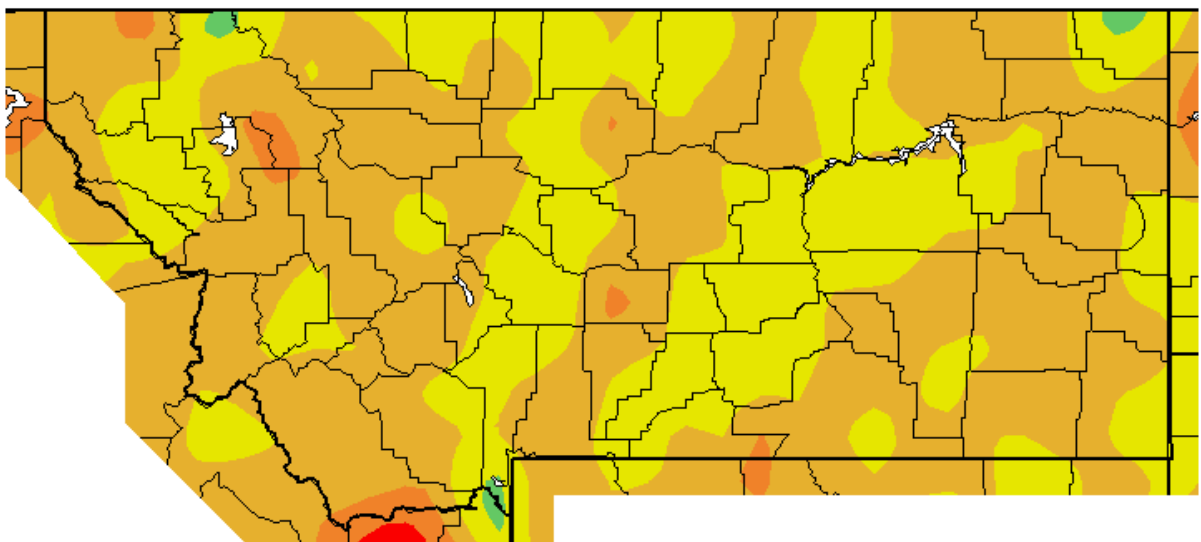


Figure 3. December 2015 precipitation departures from normal (percent) (Western Region Climate Center).

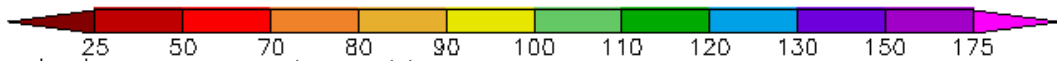
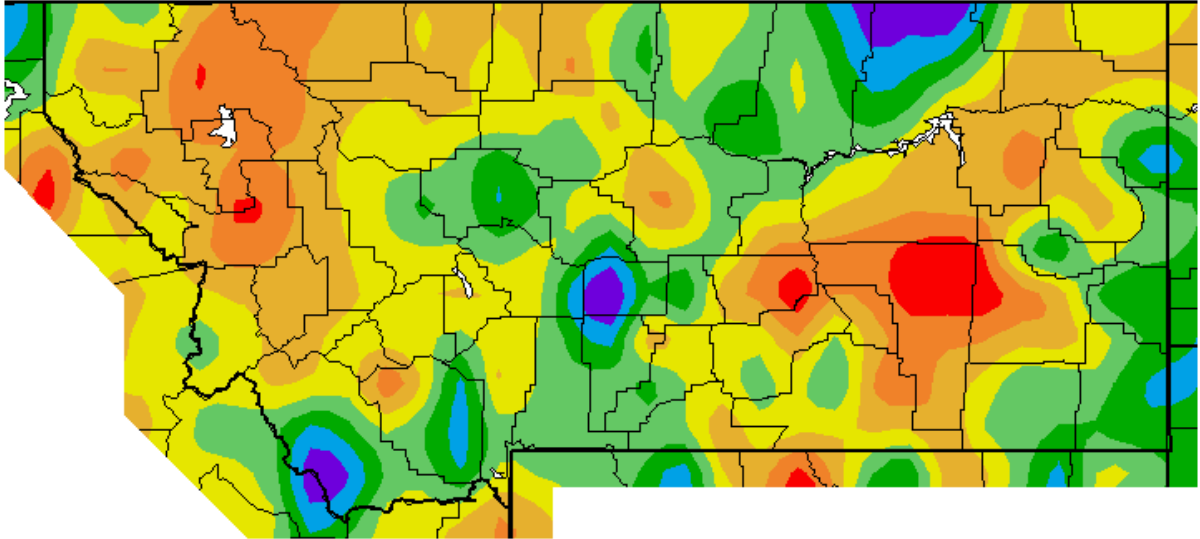
Following are two plots from the Western Region Climate Center that summarize the average temperature departure from normal, and the total precipitation departure from normal for calendar year 2015.

Ave. Temperature dep from Ave (deg F)
1/1/2015 – 12/31/2015



Generated 1/01/2016 at WRCC using provisional data.
NOAA Regional Climate Centers

Percent of Average Precipitation (%) 1/1/2015 – 12/31/2015



Generated 1/01/2016 at WRCC using provisional data.
NOAA Regional Climate Centers

For a state map of % of normal water year precipitation (updated around the 7th of each month), go to:
<http://www.wrh.noaa.gov/tfx/climate/monthlysum/climatesum.php?wfo=tx>

For the latest information on mountain snowpack from the NRCS, go to: <http://www3.wcc.nrcs.usda.gov/snow/index.html>

For the latest U.S. Drought Monitor, issued weekly by the National Drought Mitigation Center, USDA and NOAA, go to:
<http://droughtmonitor.unl.edu/>

These data are preliminary and have not undergone final QC by NEIC. Therefore, these data are subject to revision. Final and certified climate data can be access at the National Environmental Information Center (NEIC) <http://www.ncdc.noaa.gov>. Many more links are on the Drought Information Page of the NWS Great Falls web site at <http://www.wrh.noaa.gov/tfx/main/drought.php?wfo=tx>. The climatological record for normals is 1981-2010. The ranking period for temperature, precipitation and snowfall is since 1880. The ranking period for wind speeds is since 1936. The ranking period for soil moisture is since 1995.